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Prevalence of endemic acute viral conjunctivitis and its preventive and curative homeopathic management among the population of south Gujarat: A community based cross sectional study

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Abstract
Background: Endemic acute viral conjunctivitis in South Gujarat and its preventive and curative homeopathic treatment. People tend to get acute conjunctivitis during damp and humid rainy weather.
Methods: A community-based cross-sectional study has been used to assess the prevalence of endemic viral conjunctivitis among people in South Gujarat. The convenient sampling method was used to recruit 1341 participants based on eligibility criteria. Study was done in July to August 2023. A structured questionnaire was used for data collection with the help of Efron Grading Scale, which describes the severity of the symptoms. Conjunctivitis was diagnosed by symptoms like itching, burning, redness, swelling, lachrymation, mucinous discharge, irritation, photophobia and blurred vision.
Results: 27.37% of positive cases were observed out of the total number of participants. This study showed that more prevalence is present in young age group than in old age group; females (68%) were more affected than males (32%). Here it showed that in maximum number of cases, itching as a symptom was more prevalent compared to other symptoms (78.2%) and Blurred vision was less prevalent (10.35%). In homeopathy, the treatment plan for the patient with Efficacy of *Pulsatilla nigricans* was in maximum number of cases (40%), and *Euphrasia* was indicated in (20%), *Rhus toxicodendron* was one of effective medicine in (13.34%), *Arsenicum album* and *Apis mellifica* were having indication in (6.67%), Efficacy of *Calcarea carbolicum*, *Sulphur*, *Ferrum phosphoricum* and *Gelsemium* in less number of cases (3.33%).
Conclusions: Prevalence of endemic acute viral conjunctivitis is present in South Gujarat. The prevalence of acute viral conjunctivitis remains a burden for the Population in damp and humid, rainy weather. Physicians' prescriptions in our study were mainly curative. Clinical management with a homeopathy for viral conjunctivitis to provide relieve in symptoms and shorten the duration of infection.

Keywords: Acute viral conjunctivitis, homeopathy, endemic

Introduction
Conjunctivitis is a common condition around the world is conjunctivitis [6, 14]. Most people experience viral conjunctivitis, followed by bacterial conjunctivitis; and allergic conjunctivitis is encountered by nearly half of the population [6].
Conjunctivitis refers to the inflammation of the conjunctival tissue, engorgement of the blood vessels, pain, and ocular discharge [10]. It can be acute or chronic and infectious or non-infectious [10]. Acute conjunctivitis refers to symptom duration of 3 to 4 weeks from presentation (Usually only lasting 1 to 2 weeks), whereas chronic is defined as lasting more than 4 weeks [9, 10].

Etiological Classification
- Infective conjunctivitis: bacterial, chlamydial, viral, fungal, spirochaetal, protozoal, parasitic etc.
- Allergic conjunctivitis.
- Irritative conjunctivitis.
- Keratoconjunctivitis associated with diseases of skin and mucous membrane.
- Traumatic conjunctivitis.
- Keratoconjunctivitis of unknown etiology [3].

Epidemiology

There are millions of people who get conjunctivitis every year [19]. However, 80% of acute cases are caused by viruses [7, 9, 15]. These include Adenovirus, Herpes simplex virus, Varicella-zoster virus, Enterovirus70, and CoxsackieA24 [15, 18].

Human Adenovirus (HAdV) causes 65%-90% of viral conjunctivitis cases [9, 18]. These contain 7 species, HAdV A-G (85genotypes). Worldwide, various outbreaks of acute conjunctivitis associated with HAdV have been reported Type-8 [18]. In India have reported that presence of Type 2, 3, 4, 6, 7, 8 and 37 [18].

The highest rates of diagnosis are among children more than 7 years of age. The second peak of distribution occurs at the ages of 22 years in women and 28 years in men [10]

Acute conjunctivitis is common in India during the monsoon when humidity was high [13].

Clinical classification [3]	Homeopathic Management [1][4]
Acute catarrhal or mucopurulent conjunctivitis. OR Serous conjunctivitis	*Allium cepa, Apis mellifica, Belladonna, Cuprum alum, Digitalis, Euphrasia officinalis, Ferrum phosphoricum, Gelsemium (during pregnancy), Lycopodium, Mercurius solubilis, Pulsatilla nigricans, Rhus toxicodendron, Sepia, Sulphur.*
Acute purulent conjunctivitis	*Aconite napellus, Argentinum nitricum, Abrus precatorius, Calcarea carbolicum, Cina (helminthiasis), Cuprum aluminum, Euphrasia officinalis, Hepar sulphuris calcareum, Kali bichromium, Kali sulphuricum, Lycopodium, Mercurius corrosivus, Mercurius ruber, Natrum phosphoricum, Nitric acid, Phosphorus(fungal), Pulsatilla nigricans, Rhus toxicodendron, Sulphur.*
Chronic simple conjunctivitis	*Alumina, Comocledia dentata, Kali bichromium, Mercurius solubilis, Natrum arsenicum, Rhus toxicodendron, Sulphur.*
Angular conjunctivitis	*Aesculus hippocastanum, Argentinum nitricum, Cinnabaris, Graphitise, Kali bichromium, Kali carbolicum, Lycopodium, Petroleum, Ranunculus bulbosus, Rhus toxicodendron, Sepia, Silicea terra, Stannum, Sulphur, Zincum metallicum.*
Membranous conjunctivitis OR Pseudomembranous conjunctivitis	*Acetic acid, Euphrasia officinalis, Hydrastis, Natrum arsenicum, Pulsatilla nigricans.*
Papillary conjunctivitis OR Follicular conjunctivitis OR Granulomatous conjunctivitis	*Arsenic album, Abrus precatorius, Aurum, Conium maculatum, Euphrasia officinalis, Alumen, Alumina, Mercurius ruber, Natrum carbolicum, Baryta carbolicum, Calcarea carbolicum, Causticum, Chininum muriaticum, Cuprum aluminum, Kali bichromium, Natrum sulphuricum, Petroleum, Phosphorus, Pulsatilla nigricans, Thuja occidentalis, Zincum metallicum.*
Ophthalmia neonatorum	*Apis mellifica, Calcarea carbolicum, Calcarea iodata. Chamomilla, Dulcamara, Lycopodium, Mercurius corrosivus, Nux vomica, Pulsatilla nigricans, Rhus toxicodendron, Sulphur, Zincum metallicum.*
Ulcerative conjunctivitis	*Antemonium crudum, Argentinum nitricum, Croton tiglium, Clemitis, Graphities, Haemamilis, Aurum, Chininum arsenicum, Kali muriaticum, Mercurius protoiod, Mercurius solubilis, Pulsatilla nigricans, Rhus toxicodendron, Sulphur.*
Traumatic conjunctivitis.	*Allium cepa, Arnica montana, Cantharis, Hypericum, Nitric acid, Rhus toxicodendron, Ruta graveolens, Veratrum viride.*
Keratoconjunctivitis associated with diseases of skin, mucous membrane or any other disease	*China, Chloral, Clematis, Graphities, Ipecacuanha, Mercurius dulcis, Phosphorus, Pulsatilla nigricans, Rhus toxicodendron, Sulphur, Tellurium, Terebinthina, Nux vomica*
Keratoconjunctivitis of unknown etiology.	*Apis mellifica, Asafoetida, Aurum, Abrus precatorius, Chininum arsenicum, Cinnabaris, Conium maculatum, Croton tiglium, Euphrasia officinalis, Hepar sulphuris calcareum, Kali muriaticum, Kali iodatum, Kreosotum, Mercurius solubilis, Rhus toxicodendron, Sulphur.*

Aim and Objective

To evaluate the prevalence of Endemic viral conjunctivitis among people of South Gujarat.

To find out preventive and curative Homeopathic management for Endemic Viral Conjunctivitis.

Material and Methodology

Study design: Convenient sampling was used in selecting a 1341 sample for data-collection in S.S.Agrawal campus, Navsari and nearby areas. Participants were from Population of South Gujarat.

- A community based Cross sectional study involving 1341 participants. Data collection started from July to August 2023, respectively.
- A structured questionnaire was used to collect history on subjects, demographics and medical data.
- Data collection was done with the help of Efron Grading scale. On a scale of 0 to 4 (grade0: normal; grade1: trace; grade2: mild; grade3: moderate; grade4: severe) which describes the severity of the symptoms.[8]
- Conjunctivitis was diagnosed by symptoms like itching, burning, redness, swelling, lachrymation, mucinous discharge, irritation, photophobia and blurred vision.
- Case-taking was done according to guidelines mention by Dr. C.F.S. Hahnemann in Aphorisms 83-104 [2].
- Responses were assessed on the basis of symptoms and scoring as per the criteria given above

Statistical methods: Edition Windows 11 Home Single Language (Version22H2), Microsoft Excel 2016 was used in analyzing collected data, using descriptive and distributional statistics.

Observation and Result

Table 1: Distribution of cases as per age incidence (%)

Group	Percentage	Male	Female
11-20	71.39	29.16	42.23
21-30	25.34	7.36	17.98
31-40	1.91	0.27	1.64
>41	1.36	1.09	0.27

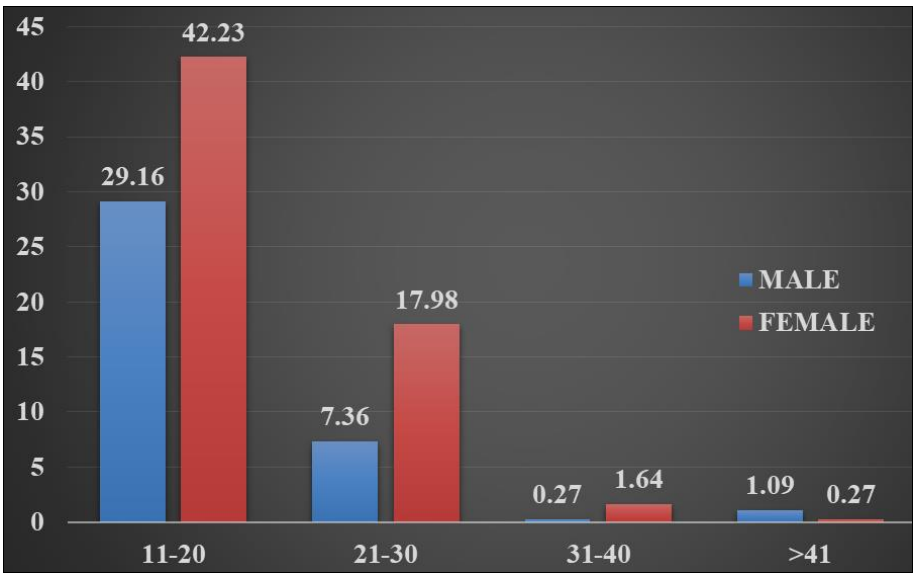

Chart 2: Male: Female Ratio (%)

Observation 1: Study showed that maximum number of cases are in between age of 11-20 i.e.71.39%. Maximum number of females affected in between age of 11-20 i.e.42.23% and maximum Number of males affected i.e.29.16%. Minimum number of cases are present after the age of 40 i.e.1.36%. Study showed that as the age figure increased, the number of prevalence of Cases were decreased. In old age group number of males' i.e.1.09% are more affected than females i.e. 0.27%. This study showed that more prevalence is present in young age group than in Old age group.

Table 2: Cases as per Gender distribution (%)

Group	Percentage
Female	62.1
Male	37.9

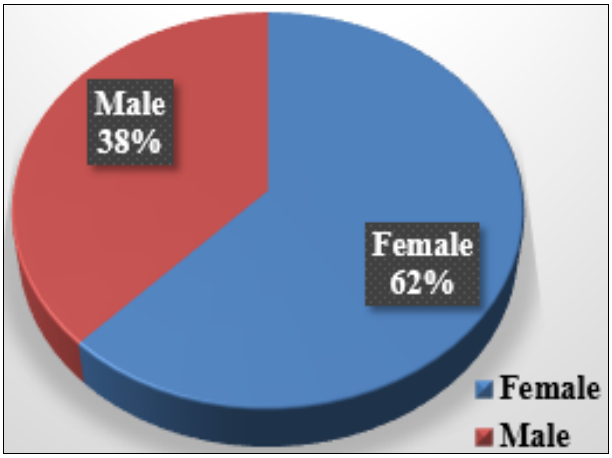

Chart 2: Gender Ratio (%)

Table 3: Distribution of cases according to Locality (%)

Locality	Percentage
Navsari	71.12
Surat	21.80
Valsad	6.54
Tapi	0.27
Dang	0.27

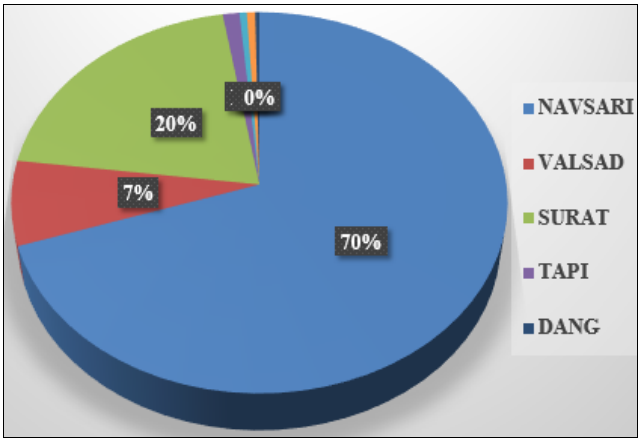

Chart 3: Distribution of Locality (%)

Observation 3: Study showed that maximum number cases were come from Navsari i.e.71.12%. Number of case in Valsad i.e.6.54%. Number of case in Surat i.e. 21.80%. Number of case in Tapi and Dang i.e.0.27%.

Table 4: Occurrence of Symptoms as per Symptomatology (%)

Symptoms	Yes	No
Itching	78.20	21.8
Burning	31.34	68.66
Redness	46.87	53.13
Irritation	44.96	55.04
Swelling	41.42	58.58
Lachrymation	46.32	53.67
Sticky-discharge	30.52	69.48
Blurred vision	10.35	73.3

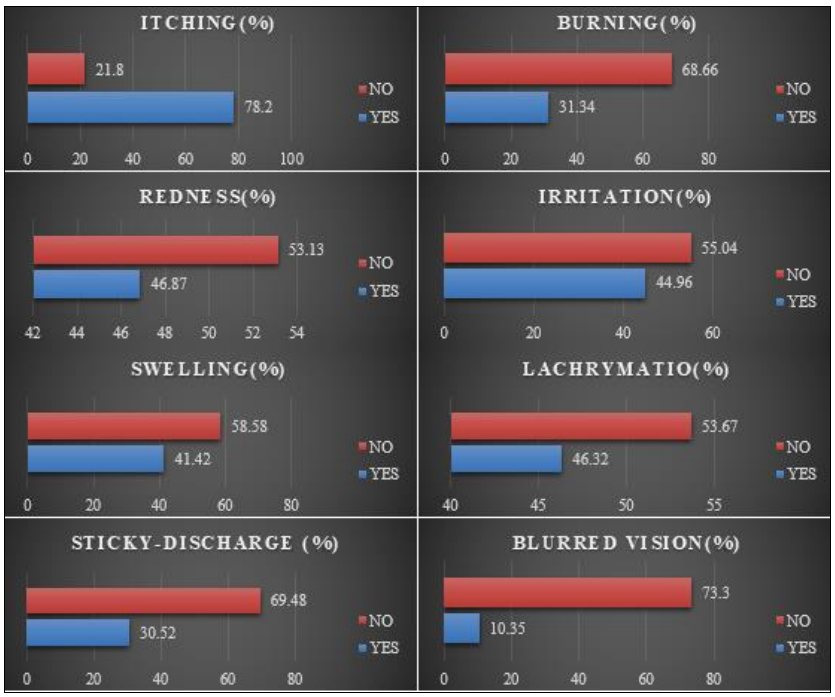

Chart 4: Occurrence of Symptoms as per Symptomatology (%)

Observation 4: Study showed that maximum number of cases, itching was more prevalent as compared to other symptoms i.e.78.20%. Blurred vision were less prevalent as compared to other symptoms i.e.10.35%. Burning were prevalent i.e.31.34%. Redness was prevalent i.e.46.87%. Irritation was prevalent i.e.44.96%. Swelling was prevalent i.e.41.42%. Lachrymation was prevalent i.e.46.32%. Sticky discharge i.e.30.52%

Table 5: Severity of the symptoms According to Efron Scale (%)

Symptoms	0	1	2	3	4
Itching	18.11	35.54	27.18	13.94	5.23
Burning	20.87	31.3	27.83	13.91	6.09
Redness	8.14	31.40	36.04	12.21	12.21
Irritation	7.27	30.92	33.33	18.18	10.3
Swelling	10.53	30.92	30.26	17.76	10.53
Lachrymation	8.24	34.7	32.35	17.06	7.65
Sticky-discharge	5.35	33.04	41.07	14.29	6.25
Blurred vision	13.27	43.88	27.55	10.20	5.10

Chart 5: Severity of the symptoms According to Efron Scale (%)

Observation 5: Study showed that Grade 1 and Grade 2 were more prevalent in compared to any other Grading score in maximum number of cases according to Efron Grading Scale that showed us the severity of symptoms.

Table 6: Indicated of Medicines according to symptom totality (%)

Medicines	Percentage
Apis mellifica	6.67
Arsenicum album	6.67
Calcarea carbolicum	3.33
Euphrasia officinalis	20
Ferrum phosphoricum	3.33
Gelsemium	3.33
Pulsatilla nigricans	40
Rhus toxicodendron	13.34
Sulphur	3.33

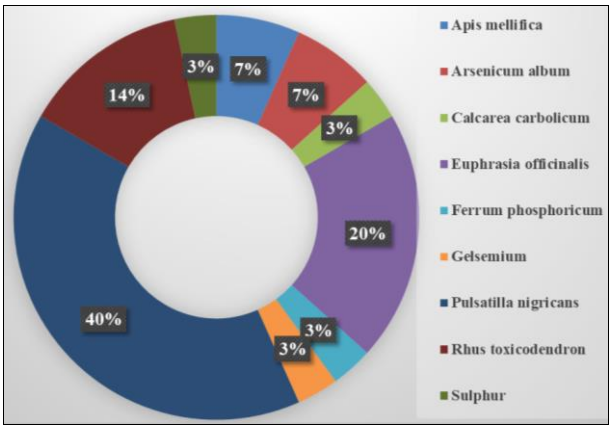

Chart 6: Indicated of Medicines According To Symptom Totality (%)

Observation 6: Study showed that Efficacy of *Pulsatilla nigricans* was in maximum number of cases with follow up i.e.40%. *Euphrasia* was indicated in number of cases with follow up i.e.20%. *Rhus toxicodendron* was one of the effective medicine in number of cases i.e.13.34%. *Arsenicum album* and *Apis mellifica* were having indication in number of cases with follow up i.e.6.67%. Efficacy of *Calcarea carbolicum*, *Sulphur*, *Ferrum phosphoricum* and *Gelsemium* in number of cases with follow up i.e.3.33%.

Discussion

Our study reported viral conjunctivitis as the common cause of acute conjunctivitis [14]. This study was done from July to August. The damp-humid weather has been reported as one of the predisposing factors for an endemic of viral conjunctivitis [14]. In 2002, More than 150,000 cases affected during monsoon in India [13]. A study gave a scientific basis to prove homeopathy, which discovered by Dr. Hahnemann and other stalwarts [2]. Other studies showed that medicines used in the treatment of Conjunctivitis in modern medicine are mainly antibiotics and steroids [7]. Physicians' prescriptions in our study were mainly curative. As per the study, Homeopathic treatment for viral conjunctivitis relieves symptoms and shortens the duration of infection.

In our study, 27.37% of patients with acute conjunctivitis tested positive for HAdV. Studies showed that females were more affected than males. Females, i.e.62.1% and males, i.e.37.9.9%.Adenoviruses are responsible for 65-90% of cases [7, 18]. The previous studies from India have shown a positivity of 13.8%-66.6% for HAdV among the patients [18]. Among the various species of HAdV (A-G), B, D, and E are more commonly involved in conjunctivitis [18]. Worldwide, genotype-8 is more prevalent (Up to 44%-100% in outbreaks), whereas Type-4 is implicated in 7%-11% of outbreaks [18]. One of the studies about the incidence of Adenovirus in viral conjunctivitis was conducted from July to December 1994 [20]. In one study, 46% of infected patients had positive cultures growing from their hand swabs, mostly due to hand washing and isolation of the infected patients [7].

Many studies have reported similarly, viral conjunctivitis is the common cause of conjunctivitis [9, 10, 6, 19, 20]. The diagnosis of viral conjunctivitis as preferred by clinicians, according to our study, was based on the clinical picture rather than laboratory investigations. However, in one study, it was stated that the rate of clinical accuracy in diagnosing viral conjunctivitis is less than 50% compared with laboratory confirmation [7]. Many cases are misdiagnosed as bacterial conjunctivitis [7, 14]. In our study, the gold standard was clinical diagnosis. In previous studies, antibiotics were frequently prescribed without good indication, resulting in a financial burden and an increase in drug-resistant bacteria [7].

Previous studies have shown that a first outbreak of Acute Conjunctivitis was first reported in Ghana, Africa in 1969. [5, 11] During 1971-72, enterovirus spread to other parts of Africa and Asia, including India [12]. There was an outbreak in Bombay (Western India) in 1971-72, during 1991 in Pune, and Delhi, in 1991, in southern India (Madras eyes) in 1975, and in north India in 1981 (In rainy season) [12, 13]. An outbreak of acute conjunctivitis occurred during the months of August to September 2003 in Maharashtra and Gujarat states of India [21]. In our study showed that India has history of epidemic or endemic acute outbreak of Conjunctivitis since 1971-72 in rainy season with humidity from July to September and now this endemic outbreak is from July to August in rainy season with humidity in acute viral conjunctivitis.

In the present study, nine medicines were indicated in cases as per symptom totality according to the guidelines mention by Dr. C.F.S. Hahnemann in Aphorisms 83-104 [2]. Viral conjunctivitis is often misdiagnosed as bacterial conjunctivitis, and the treatment for it has not been established [7, 14]. This study focused on the preferred Homeopathic management of viral conjunctivitis. The maximum indicated Homeopathic medicines were *Pulsatilla nigricans* (40%), *Euphrasia* (20%), and *Rhus toxicodendron* (13.34%). Other medicines like *Apis mellifica* and *Arsenic album* were indicated (6.67%), as were *Calcarea carbolicum*, *Gelsemium*, *Ferrum phosphoricum*, and *sulphur* (3.33%).

Conclusion

Here it clearly showed that there is Prevalence of endemic acute viral conjunctivitis is present in South Gujarat. It remains a burden for the population to deal with viral conjunctivitis. Most cases of viral conjunctivitis occur in damp, humid rainy weather. Clinical features are primarily used to formulate the diagnosis. Many of the patients who received homoeopathic treatment were satisfied with the management with homoeopathic medicines along with preventive measures. There were no complications among homeopathic patients who received treatment with homeopathic medicines with preventive measures. Here *Pulsatilla nigricans* was the most indicated remedy for the

acute viral conjunctivitis followed by *Euphrasia and Rhus toxicodendron*, Physicians' prescriptions in our study were mainly curative and supportive with preventive measures. Treatment with homeopathy for viral conjunctivitis to provide relieve symptoms and shorten the duration of infection.

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Conflicts of interest
There are no conflicts of interest.

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